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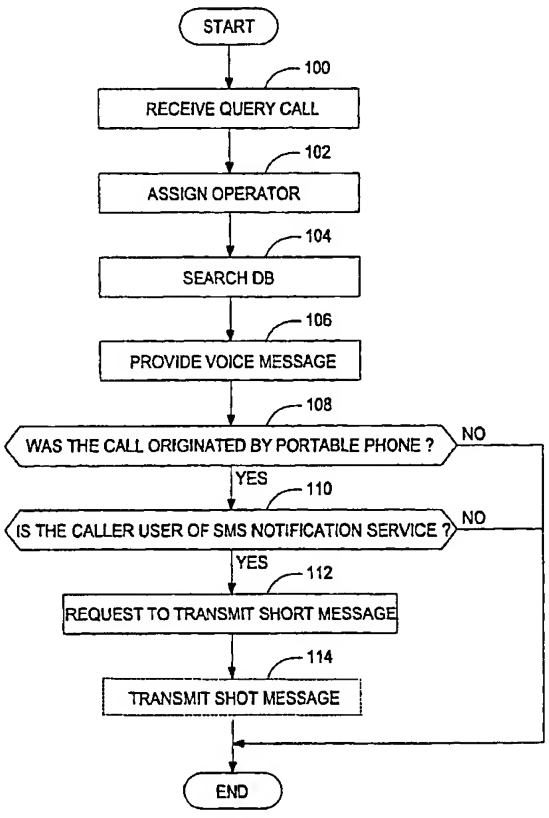
(54) Title: METHOD FOR PROVIDING TELEPHONE DIRECTORY SERVICE ACCOMPNYING SMS NOTIFICATION




(57) Abstract: A method for providing telephone directory information service for facilitating a user to store the queried phone number in a portable phone and prevent from re-querying the number in future. When a directory information service provider provides the queried phone number to the user, the provider transmits the number and the owner information to the portable terminal of the user through a short message.

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# METHOD FOR PROVIDING TELEPHONE DIRECTORY SERVICE ACCOMPANYING SMS NOTIFICATION

## Technical Field

The present invention relates to a method for providing telephone directory service and, more particularly, to a method for providing telephone directory service for a portable terminal.

## Background Art

When a person wants to place a call, he or she has to dial the receiving party's phone number. If the calling party does not know the called party's phone number, the calling party typically places a call to a directory service system to get the number. Presently, the directory service for standard phones provided a directory service system of a PSTN is generally accessible by a portable phone. When using the directory service for standard phones, the user of a portable phone has to dial the area code and the phone number of the directory service system. For example, in the case that the portable phone user wants to get a number of a standard phone in Seoul area, the user dials "02 114" to access the directory service system in Seoul.

If the caller hears the instruction of the operator and tells the name of the concerned person after a connection is established to the directory service system, the operator finds the queried phone number in the database. The found phone number is

synthesized to a voice message by a computer telephony integration (CTI) system to be provided to the caller.

However, it is common that the user who have queried a phone number to the directory service system needs the same number later. If the user did not make a note of the queried phone number or carry the note, the user has to use the directory service for the same number again. In particular, the user of a portable phone usually cannot make a note of the queried phone number because the user typically use the directory service during a movement which makes it substantially difficult to make a note. If the user happen to use the directory service frequently, particularly, for the same numbers, the user bears increased economical burden and may suffer from a psychological stress. Also, the common carrier who operates the directory service system may bear increased costs for implementing and maintaining the system.

The function of saving phone numbers which most portable phones support may mitigate the problems. However, it is troublesome to save the queried phone number into the portable phone after using the directory service and then dial the phone number to place a call. Thus, it is quite probable that the user does not save the phone number into the portable phone if the user is busy or do not guess that the possibility of using the phone number again in the future is so high. Consequently, the function of saving phone numbers is not expected to substantially decrease the frequent use of the directory service of the portable phone users..

Meanwhile, it has been proposed that the directory service system automatically connects a call between the caller and the called party after providing the voice message

notifying the queried phone number. However, the negotiation over the sharing ratio of charges between the wireless carrier and the common carrier has to be settled in advance, such a service does not seem to be implemented immediately. Further, the automatic connection service is meaningless when the called party's phone is busy or the caller just wishes to know the phone number immediately and place a call later. Besides, such a service cannot remove the possibility of using the services for the same phone number when the user needs the number later again.

Disclosure of the Invention

To solve the above problems, an object of the present invention is to provide a method for providing telephone directory information service which provides a queried phone number to a portable terminal of the user through a short message, so that the user easily stores the queried phone number into the portable phone for placing a call by use of the stored phone number and preventing of re-querying the number in the future.

According to an aspect of the present invention for achieving the above object, a common carrier operating a PSTN transmits a queried phone number to the portable terminal of the user through a character message in response to a query. First, means for storing multiple phone numbers and respective owner information is provided. When a query call including a query condition received from the user through a predetermined communications channel, a queried phone number and owner information of the queried phone number corresponding to the query condition is read out from the storing means. Then, the queried phone number is provided through the communications channel, and the

queried phone number and the owner information is transmitted to the portable terminal by the character message.

In a preferred embodiment, the multiple phone numbers stored in the storing means are numbers of phones subscribed to a PSTN, and the query call is received from the portable terminal through a wireless communications network. Thus, the method of the present invention provides a phone number subscribed to the PSTN to a portable terminal.

When the directory service system receives the query call, it is preferable that directory service system receives a call ID representing the portable terminal from the wireless communications network. Also, directory service system preferably receives subscription information indicating whether the character message is to be transmitted to the portable terminal. If the subscription information is not received from the wireless communications network, directory service system inquires the user whether to receive the character message, and transmits the queried phone number and the owner information to the portable terminal by the character message only when the user agrees to the transmission of the character message. When none of the call ID and the subscription information is available, directory service system inquires the user whether to receive the character message, requesting the user to input the ID of the portable terminal, and then receives the ID from the portable terminal.

The wireless communications network comprises a character message service center for transmitting the character message to the portable terminal in response to an external request. In an embodiment, the directory service system directly requests the character message service center to transmit the character message containing the queried

phone number and the owner information to a portable terminal having the caller ID. Alternatively, however, the directory service system may provide the queried phone number and the owner information to a predetermined agent system, so that the agent system requests the character message service center to transmit the character message.

Another aspect of the present invention is directed to a method for providing a character message for a queried phone number by the common carrier or a separate agent system when providing a voice directory service. a character message service agent system is linked to a directory service system, which receives a query call from a portable terminal capable of receiving a character message and provides a queried phone number corresponding to a query condition included in the query call.

First, the agent system receives, from the directory service system, basic information including the queried phone number, owner information of the queried phone number, and an ID of the portable terminal. Then, the agent system requests to transmit the character message containing the queried phone number and the owner information to a portable terminal having the ID to a character message service center of a wireless communications network.

The agent system preferably, includes means for storing information of telephone subscribers categorized into a predetermined categories. In such a case, the agent system determines, based on the basic information, whether there is any record relevant to the query call in the storing means. When there is any record relevant to the query call, the agent system requests the character message service center to transmit the character message containing at least one field of the relevant record to the portable terminal. At this

time, the agent system may generate a second character message containing at least one field of the relevant record to the portable terminal separately from a first character message containing the queried phone number and the owner information. Alternatively, the agent system may generate a single character message for the queried phone number, the owner information, and at least one field of the relevant record.

Yet another aspect of the present invention is directed to a method for providing a character message for a queried phone number carried out by a wireless carrier. Here, the wireless carrier can transmit a character message for a queried phone number provided by a common carrier or for a queried portable phone number provided by the wireless carrier itself.

When transmitting the character message for the queried phone number provided by the common carrier, the wireless communications system receives a query call including a query condition from a portable terminal, and routes the query call to the directory service system of the PSTN. Then, the wireless communications system makes a voice message containing a queried phone number corresponding to the query condition to be provided from the directory service system to the portable terminal. At this time, the wireless communications system converts the voice message signal of the queried phone number to text data to retrieve the queried phone number, and provides a character message containing the queried phone number to the portable terminal.

When transmitting the character message for the queried portable phone number provided by the wireless carrier itself, the wireless communications system is equipped with means for storing multiple phone numbers and respective owner information. When

receiving a query call including a query condition from the portable terminal, the wireless communications system reads out, from the storing means, a queried phone number and owner information of the queried phone number corresponding to the query condition to provide the queried phone number to the portable terminal. Afterwards, the wireless communications system transmits a character message containing the queried phone number and the owner information to the portable terminal.

Brief Description of the Drawings

The above objectives and advantages of the present invention will become more apparent by describing in detail preferred embodiments thereof with reference to the attached drawings in which:

FIG. 1 illustrates an example of a network environment suitable for implementing the present invention;

FIG. 2 is a flowchart showing an embodiment of the method for providing the telephone directory information service performed by the directory service system shown in FIG. 1;

FIG. 3 is a flowchart showing another embodiment of the method for providing the telephone directory information service;

FIG. 4 is a flowchart showing yet another embodiment of the method for providing the telephone directory information service;

FIG. 5 illustrates another example of the network environment suitable for implementing the present invention;

FIG. 6 illustrates program modules and database tables in the short message handling server shown in FIG. 5;

FIG. 7 is a flowchart showing the process of handling short messages in the short message handling server shown in FIGS. 5 and 6; and

FIG. 8 illustrates yet another example of the network environment suitable for implementing the present invention.

Embodiments

FIG. 1 illustrates an example of a network environment suitable for implementing the present invention. A wireless communications network 20 and a Public Switched Telephone Network (PSTN) 40 are shown in the drawing.

A Central Gateway Switch (CGS) 22 is connected to multiple Mobile Switching Centers (MSC's) 24a-24n in the wireless communications network 20. Each MSC is connected to a plurality of base stations 26 and at least one Short Message Service Server (SMSS) 30 by way of a Short Message Service Center (SMSC) 28 for providing short message services. The SMSS 30 maintains a short message client database and provides an interface to external information providers (IP's). The SMSC 28 is connected to the MSC 24a by a Signaling System No.7 interface to transmit the data from the SMSC 30 to a portable terminal 10 through the MSC 24a. Meanwhile, the CGS 22 is connected to an Inter-Gateway Switch (IGS) 42 of the PSTN by the Signaling System No.7 interface.

Even though not shown in FIG. 1, each of the MSC's 24a-24n includes a Home Location Register (HLR) containing all the administrative information of each subscriber

(e.g., kinds of services used by the subscriber) and Visitor Location Register (VLR) containing selected administrative information from the HLR of visiting subscribers. In particular, according to the present invention, the subscriber information of HLR includes a field indicating whether the subscriber applied for the service of notification of a queried phone number to the portable terminal of the user by a short message after querying a telephone number by dialing '(area code)+114', which is referred to as SMS notification service, hereinbelow. When a mobile subscriber who applied for the SMS notification service dials '(area code)+114' to access the PSTN phone number directory service, the MSC handling the query call provides the PSTN 40 with the caller information including the caller ID of the subscriber along with the SMS notification service indication flag.

Meanwhile, the PSTN 40 includes the IGS 42, a local switch 44 electrically connected to the IGS 42, and a directory service system 46. Even though just a single local switch 44 directly coupled to the IGS 42 is shown in FIG. 1, those skilled in the art will appreciate that there are many switches in the PSTN arranged hierarchically so that each local switch 44 is connected to the IGS 42 through plural switches. Also, even though just a single directory service system 46 is shown in FIG. 1, the PSTN 40 may include a plurality of the directory service systems distributed to for each local switch 44 or concentrated in a single location by the choice of the common carrier. Thus, the interconnection of the IGS 42, the local switch 44 and the directory service system 46 in FIG. 1 should be understood to be illustrative.

The directory service system 46 includes a database (DB) server 52, a query call distributor 54, and a plurality of operator terminals 56a-56m for service operators. Each

operator terminal includes a computer for searching a queried phone number data from the DB server 52 and an audio transceiver (e.g., a headset) for counseling with the caller. The computer of each operator terminal is connected to the DB server 52 through a data bus 58 so as to access the DB server 52 according to a network protocol such as the Ethernet or the TCP/IP. Also, the query call distributor 54 can access the DB server 52 through the data bus 58. The headset of each operator terminal can be connected to the portable terminal of the caller via the query call distributor 54 and the local switch 44 through an audio channel 59. Further, the directory service system 46 may further include another host computers for controlling the DB server 52 and/or the query call distributor 54 and for the interface with the SMSC 30.

The hardware of the query call distributor 54 may be implemented based on a common Computer Telephony Integration (CTI) system. However, the software of the query call distributor 54 includes modules for determining whether the caller is a user of the SMS notification service and providing data for implementing the SMS notification service. Also, the query call distributor 43 is connected to the SMSS 30 of the wireless communications network 20 through a dedicated line. Before or after the service operator counsels with the caller, the query call distributor 43 analyzes the caller information in the control signal of the query call to determine whether the caller is a user of the SMS notification service. In the case that the caller is a user of the SMS notification service, the query call distributor 43 provides the queried phone number along with the name of the phone number to the SMSS 30 through the dedicated line, so that the SMSS 30 transmits a short message containing the queried phone number and the name of its owner.

Accordingly, the portable terminal of the user receives and displays the short message just after the terminal reproduces the voice signal received from the directory service system 46 through a traffic channel, so that the user can store the queried phone number and the name of its owner.

The short message transmitted according to the present invention may further include the address or another geographical information of the owner in addition to the queried phone number and the name of its owner. In the case that the address provided, the query call distributor 54 obtains the address data from the DB server 52. In the case that another geographical information such as a map is provided, the query call distributor 54 preferably includes an additional server for maintaining the geographical information. Alternatively, however, the geographical information may be obtained from an external server. On the other hand, if the owner of the queried phone number possesses a domain name for allowing its server in the Wireless Application Protocol (WAP) or the World Wide Web (WWW), the query call distributor 54 can provide the domain name additionally.

The process of carrying out the telephone directory service in such a system will now be described in more detail. First, the portable phone user who wishes to use the SMS notification service subscribes to the wireless carrier. As described below, however, that the user may have to subscribe to the common carrier operating the PSTN or another agent handling the short messages. In another alternative embodiment, the subscription may be unnecessary but the directory service system 46 checks, for each query call, whether the user wishes to receive the SMS notification.

In a preferred embodiment, when the MSC 24a detects a query call initiated by the portable terminal 10, the MSC 24a obtains the profile of the caller from the HLR. Here, if the caller is a visiting subscriber, the MSC 24a requests and obtains the profile of the caller from the HLR pertaining to the caller on the basis of routing information stored in a Signaling Transfer Point (STP). Upon receiving the subscriber profile, the MSC 24a adds the caller ID and the SMS notification service indication flag to a control signal, and then turns over the query call along with the control signal to the IGS 42 of the PSTN via the CGS 22. The IGS 42 detects the area code in the query call to redirect the query call to a competent local switch 44. The local switch 44 connects the query call to the directory service system 46.

FIG. 2 is a flowchart showing an embodiment of the method for providing the telephone directory information service performed by the directory service system 46. Receiving the query call in step 100, the query call distributor 54 assigns an operator in a stand-by condition to the query call by routing the call to the headset of the assigned operator (step 102). Accordingly, a communication channel is established between the caller using the portable terminal 10 and the headset of the operator. After hearing the search condition provided by the caller, the operator searches and selects a queried phone number in the DB server 52 (step 104). In response to the selection of a record by the operator, the query call distributor 54 synthesizes a voice message from the queried phone number to provide to the caller (step 106).

After providing the voice message, the query call distributor 54 determines whether the query call was originated by a portable terminal (step 108). If it is determined that the

query call was originated by a portable terminal in the step 108, the query call distributor 54 determines, based on the user profile in the control signal, whether the caller is a user of the SMS notification service (step 110). If the caller is a user of the SMS notification service, the query call distributor 54 requests, to the SMSC 28 via the SMSS 30, to transmit a short message containing the queried phone number and the name of its owner to the caller ID (step 112). The SMSC 28 transmits the short message via the MSC 24a (step 114). If it is determined that the query call was not originated by a portable phone in the step 108 or the caller is not a user of the SMS notification service in the step 110, directory information service procedure is terminated.

FIG. 3 is a flowchart showing another embodiment of the method for providing the telephone directory information service. If the time gap between the reproduction of the voice message and the arrival of the short message is greater than a certain level, the usefulness of the SMS notification service may be reduced. Thus, it is preferable to shorten the time for generating and transmitting the short message. In the embodiment of FIG. 3, the generation of the short message is initiated before providing the voice message, so that the short message is generated and transmitted while the voice message is being provided.

After the operator selected a queried phone number in the DB server 52 in step 104, the query call distributor 54 determines, before providing the voice message, whether the query call was originated by a portable phone and the caller is a user of the SMS notification service (steps 126 and 128). If the caller is a user of the SMS notification service, the query call distributor 54 provides the message contents and the caller ID to the

SMSC 28 so that the short message is transmitted as mentioned above (steps 130 and 132). Afterwards, the query call distributor 54 proceeds to synthesize and provide the voice message (step 134). Since the steps 126 through 130 takes little time, the present embodiment can reduce the short message generation time by the reproduction period of the voice message.

FIG. 4 is a flowchart showing yet another embodiment of the method for providing the telephone directory information service. In case that the SMS notification service is provided by the common carrier operating the PSTN, the common carrier has to cooperate with the wireless carrier inevitably because the common carrier has to receive the caller profile, particularly, the SMS notification service indication flag, stored in the HLR whenever the query call is received. The embodiment of FIG. 4 is suitable when the cooperative relationship between the common carrier and the wireless carrier is not formed. In this embodiment, the directory service system 46 individually inquires of the caller whether to receive the SMS notification service and provides the service only when the caller agrees to that. The common carrier may bill an additional fee for each short message to the caller.

Referring to FIG. 4, after the operator searched and selected a queried phone number in the DB server 52 in step 104, the query call distributor 54 determines whether the query call was originated by a portable phone before providing the voice message (step 146). In case that the query call was originated by a portable phone, the query call distributor 54 provides a brief introductory message to the user and inquires of the user whether to receive the SMS notification service (step 148). If the user presses service

acceptance key pattern (e.g., "**") after hearing the introductory message in step 150, the query call distributor 54 provides the message contents and the caller ID to the SMSC 28 so that the short message is transmitted as mentioned above (steps 152 and 154). Afterwards, the query call distributor 54 proceeds to synthesize and provide the voice message (step 156). Meanwhile, in case that the user presses another key while or after hearing the introductory message, the query call distributor 54 synthesizes and provides the voice message immediately.

In an alternative of the embodiment of FIG. 4, the step of providing the introductory message may be performed before the user tells the operator the query condition or while the operator searches the DB server. On the other hand, the wireless carrier may not provide even the caller ID to the common carrier beyond the SMS notification service indication flag. In such a case, the query call distributor 54 can receive the caller ID from the user. In other words, when the user wishes to receive the SMS notification service after hearing the introductory message in the step 150, the query call distributor 54 instructs to input the portable phone number and receives such number.

FIG. 5 illustrates another example of the network environment suitable for implementing the present invention. In FIG. 5, a short handling message server 80 is shown in addition to the wireless communications network 20 and the PSTN 40. The operator of the short handling message server 80 may provide diverse information as well as the SMS notification service based on the cooperation with the PSTN operator. Of course, the short message server 80 may be operated by the PSTN operator itself.

In FIG. 5, the short message server 80 is connected to the query call distributor 54 and the SMSS 30 through respective dedicated lines. The query call distributor 54 provides the queried phone number, its owner information, and the caller ID in a data frame of a certain format. The short message handling server 80 maintains a trade name database of its own. When a received owner information belongs to a certain category, the short message handling server 80 extracts relevant data from the database to provide to the portable terminal 10 through the wireless communications network 20. Each data record may be provided in a separate short message. Alternatively, however, plural data records may be provided in a single message.

FIG. 6 illustrates program modules and database tables in the short message handling server 80. A database 82 includes an indexing table 84, a shop information table 86, and a subscriber table 88, and the application program 90 includes a DB management table 92, a search module 94, a SMS initiator 96, and a WAP contents processing module 98.

In the database 82, the indexing table 84 stores shop indexing data for several types of businesses and geographical locations. The shop indexing data is categorized with emphasis on frequently queried types of businesses (e.g., call taxi companies, gas stations, hotels, restaurants, and discount stores. The shop information table 86 stores detailed information of each shop such as the name, the phone number, the location, and a brief map. Also, the shop information table 86 may further store a domain name of the WAP or Web site of the shop if available. The subscriber table 88 stores information of users

subscribed to the system. Particularly, the subscriber table 88 includes detailed information of users who frequently uses the directory service.

In the application program 90, the DB management table 92 enables the operator of the server to add a new record, and modify or delete a stored record in the database 82. The search module 94 receives the queried phone number, its owner information, and the caller ID from the query call distributor 54 in the case that the caller is the user of the SMS notification service, and searches relevant data in the database 82 when the received owner information belongs to a certain category. In case that there is any relevant data, the SMS initiator 96 generates a separate short message for the extracted data to provide to the portable terminal 10 through the wireless communications network 20. On the other hand, when a Personal Digital Assistant (PDA) or a cellular phone equipped with a WAP browser requests information through the wireless Internet regardless of the telephone directory service, the WAP contents processing module 98 generates a WAP page by processing information in the database to provide to the terminal through the through the wireless communications network 20.

FIG. 7 is a flowchart showing the process by which the short message handling server 80 shown in FIGS. 5 and 6 provides the short message services. When receiving the queried phone number, its owner information, and the caller ID from the query call distributor 54, the web server of the short message handling server 80 provides such data to the search module 94 (step 200). The search module 94 determines whether the received owner information belongs to a certain category, and searches relevant data in the database 82 (steps 202 and 204). First, the search module 94 search the indexing table 84

to find a record having the same area code with the queried phone number or having another relationship under a predetermined criterion. If there is any such record in step 206, the search module 94 fetches detailed data of the record from the shop information table 86 (step 208). Here, it is preferable to fetch only two or three records to maximize the benefit of the information while reducing the waiting time and the expense burden of the user. Upon completion of the extraction of the data, the SMS initiator 96 requests, to the SMSS 30, to send a short message containing the introduced phone number and the name of its owner for each record to the caller ID (step 210).

FIG. 8 illustrates yet another example of the network environment suitable for implementing the present invention. In the example of FIG. 8, the SMS notification service is provided by the wireless carrier. The directory service system 346 or the query call distributor 354 provides only the general audio directory service. Meanwhile, the MSC 24a in the wireless communications network 320 is equipped with or connected to a voice-to-text converter 360. The voice-to-text converter 360 converts the queried phone number portion in the voice message into a text data, and provides the text phone number and the caller ID or the user ID to the SMSC 28 so that the SMSC 28 sends a short message to the portable terminal 10. In such a case, the name of the owner of the queried phone number may be blanked or filled with a serial number, so that the user edits or fills the name.

On the other hand, the wireless carrier can construct a phone number database of its own by acquiring the phone numbers by itself to provide the name of the owner along with the queried phone number by the short message. The voice-to-text conversion is

known in the art and various algorithm has been proposed already. In particular, since the voice message provided by the directory service system 346 is not actual voice but synthesized one converted from the text data and thus is simple in its pattern, the voice message can be converted into text data easily.

Although the present invention has been described in detail above, it should be understood that the foregoing description is illustrative and not restrictive. Those of ordinary skill in the art will appreciate that many obvious modifications can be made to the invention without departing from its spirit or essential characteristics. For example, a plurality of wireless communications network and PSTN may be involved with the service of the present invention. In particular, in the case that the SMS notification service is provided by the short message handling server as shown in FIG. 5, the server 80 can provide the service to any portable terminal subscribed to any wireless communications network. The terminals which can receive the service of the present invention are not limited to cellular phones but include any portable terminals which enable voice communications and receipt of short messages. Further, the SMS notification service of the present invention is applicable to any kinds of terminals capable of receiving data from a network but not supporting voice communications.

Meanwhile, though it was described that the query call distributor 54 is directly connected to the SMSS 30 by a dedicated line in FIG. 1, the query call distributor 54 may be connected to a web server which provides the short message traffic to the SMSS 30 through the Internet, alternatively. Also, in an alternative of the embodiment of FIG. 5, the query call distributor 54 may be connected to a web server, and the short message

handling server 80 receives the short message traffic from the web server through the Internet and requests to transmit short messages to the SMSS 30 through the Internet. Of course, the query call distributor 54 may be connected to the short message handling server 80 by a dedicated line, while the short message handling server 80 is connected to the SMSS 30 through the Internet. Those skilled in the art will appreciate that the network topology of each network may be modified to somewhat extent but the present invention can be adapted to such modification without departing from essential characteristics.

Though it was described above that the queried phone number is provided by a short message, the queried phone number may be transmitted by WAP push technology, alternatively. Such an embodiment is particularly useful when the SMSS 30 is connected to the query call distributor 54 or the short message handling server 30. In such a case, the queried phone number may be pushed from a web server of the common carrier via a WAP proxy server or directly pushed from a Wireless Telephony Application (WTA) Server of the common carrier after being prepared in Wireless Markup Language (WML) page. Also, the WAP proxy server or the WTA server may be operated by another agent which may compared to the short message handling server 80 mentioned above. While the user can save the queried phone number in the telephone directory in the portable terminal when the queried phone number is provided by the short message, the queried phone number may be saved in a telephone directory generated and maintained in the wireless Internet server in the case the queried phone number is provided by the WAP push technology.

It was mentioned, above, that the user has to subscribe to the service in advance or agree to receive the service for individual query. Alternatively, however, the wireless carrier may maintain a special access number for the service. For example, when the MSC 24a receives a certain sequence of dialed numbers, e.g., "** 02 114", the MSC 24a recognizes the sequence as "a request of phone number query for a phone in Seoul area to be accompanied by a short message" and routes the call to the directory service system 346 of the PSTN with a service indication in the control signal. Such a modification may be applied to all the above-mentioned embodiments including that of FIGS. 1 and 8.

Although above descriptions were focused on the directory information of telephones subscribed to the PSTN, the present invention can be applied to the directory information of portable terminals. That is, even though most wireless carriers do not provide directory information services until now, wireless carriers may provide the services, in the future, with the SMS notification of the present invention. Since those skilled in the art can implement such an embodiment based on the above descriptions, more detailed description thereof is omitted.

Those who implement the present invention can provide the a SMS directory service by receiving a request through the Internet separately from the common directory service described above. In such a case, the user can access the web site of the operator through the Internet and search a plurality of phone numbers to download the phone numbers by plural short messages sequentially. Those skilled in the art can implement such an embodiment based on the above descriptions, also.

Thus, it should be apparent that the invention can be modified in arrangement and detail without departing from such principles. We claim all modifications and variation coming within the spirit and scope of the following claims.

Industrial Applicability

As described above, the present invention provides a queried phone number by SMS service to whom uses the telephone directory service using a portable terminal. Thus, the user can obviate the burden of making a note of the queried phone number and save it to his terminal correctly and easily. Also, the user can easily dial the phone number by the stored data and reduce duplicate queries because of the loss of the notes.

Thus, user can reduce the air charge to be paid to the wireless carrier and the query change to be paid to the operator of the directory service system, save the time for query, and be free from the stress coming from the duplicate queries. Particularly, when the service is provided by the short message handling server described above, the user can get plural relevant phone numbers and get more freedom of choice to buy products.

Also, the common carrier operating the directory service system can reduce the total size of the system and thus decrease the costs for implementing and maintaining the system.

What is claimed is:

1. A method for providing telephone directory service to a user having a portable terminal capable of receiving a character message, comprising the steps of:

(a) providing means for storing multiple phone numbers and respective owner information;

(b) receiving a query call including a query condition from the user through a predetermined communications channel;

(c) reading out, from the storing means, a queried phone number and owner information of the queried phone number corresponding to the query condition; and

(d) providing the queried phone number through the communications channel and making the queried phone number and the owner information to be transmitted to the portable terminal by the character message.

2. The method as claimed in claim 1, wherein the multiple phone numbers stored in said step (a) are numbers of phones subscribed to a PSTN,

wherein the query call is received from the portable terminal through a wireless communications network in said step (b),

wherein a phone number subscribed to the PSTN is provided to a portable terminal in said step (c).

3. The method as claimed in claim 2, wherein said step (b) further comprises the step of:

receiving a call ID representing the portable terminal from the wireless communications network.

4. The method as claimed in claim 3, wherein subscription information indicating whether the character message is to be transmitted to the portable terminal is received along with the caller ID in said step (b).

5. The method as claimed in claim 3, further comprising the step of:

inquiring the user whether to receive the character message,

wherein the queried phone number and the owner information is transmitted to the portable terminal by the character message only when the user agrees to the transmission of the character message.

6. The method as claimed in claim 2, further comprising the steps of:

inquiring the user whether to receive the character message;

requesting the user to input the ID of the portable terminal if the user agrees to the transmission of the character message; and

receiving the ID from the portable terminal.

7. The method as claimed in claim 2, wherein the wireless communications network comprises a character message service center for transmitting the character message to the portable terminal in response to an external request,

wherein, in said step (d), a request for transmitting the character message containing the queried phone number and the owner information to a portable terminal having the caller ID is provided to the character message service center.

8. The method as claimed in claim 2, wherein the wireless communications network comprises a character message service center for transmitting the character message to the portable terminal in response to an external request,

wherein, in said step (d), the queried phone number and the owner information is provided to a predetermined agent system, so that the agent system requests the character message service center to transmit the character message containing the queried phone number and the owner information to a portable terminal having the caller ID.

9. In a character message service agent system linked to a directory service system which receives a query call from a portable terminal capable of receiving a character message and provides a queried phone number corresponding to a query condition included in the query call, a method for providing a directory service character message comprising the steps of:

(a) receiving, from the directory service system, basic information including the queried phone number, owner information of the queried phone number, and an ID of the portable terminal; and

(b) requesting for transmitting the character message containing the queried phone number and the owner information to a portable terminal having the ID to a character message service center of a wireless communications network.

10. The method as claimed in claim 9, further comprising the step of:

providing means for storing information of telephone subscribers categorized into a predetermined categories, before said step (a),

wherein said step (b) comprises the steps of:

determining, based on the basic information, whether there is any record relevant to the query call in the storing means; and

when there is any record relevant to the query call, requesting the character message service center for transmitting the character message containing at least one field of the relevant record to the portable terminal.

11. The method as claimed in claim 10, wherein said step (b) comprises the steps of:

requesting the character message service center for transmitting a first character message containing the queried phone number and the owner information to the portable terminal; and

requesting the character message service center for transmitting a second character message containing at least one field of the relevant record to the portable terminal.

12. The method as claimed in claim 10, wherein, in said step (b), a request for transmitting the character message containing the queried phone number, the owner information, and at least one field of the relevant record to the portable terminal is provided to the character message service center.

13. In a wireless communications system linked to a PSTN including a directory service system, a method for providing a directory service character message comprising the steps of:

receiving a query call including a query condition from a portable terminal;

routing the query call to the directory service system of the PSTN;

making a voice message containing a queried phone number corresponding to the query condition to be provided from the directory service system to the portable terminal;

converting the voice message signal of the queried phone number to text data to retrieve the queried phone number; and

providing a character message containing the queried phone number to the portable terminal.

14. In a wireless communications system which can be accessed by a portable terminal capable of receiving a character message, a method for providing a directory service character message comprising the steps of:

providing means for storing multiple phone numbers and respective owner information;

receiving a query call including a query condition from the portable terminal;

reading out, from the storing means, a queried phone number and owner information of the queried phone number corresponding to the query condition;

providing the queried phone number to the portable terminal; and

transmitting a character message containing the queried phone number and the owner information to the portable terminal.

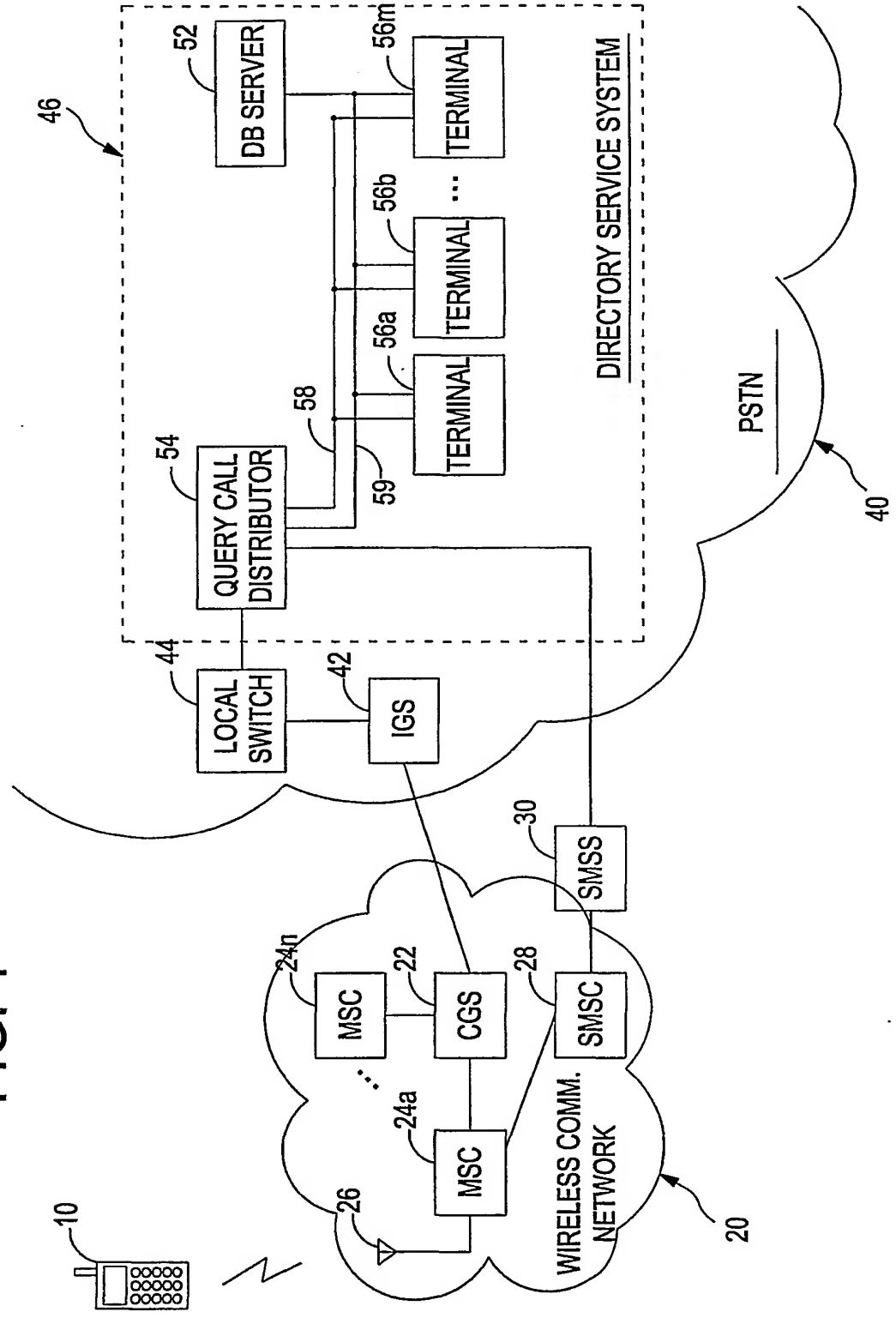

46
52
DB SERVER
56m
TERMINAL
56b
TERMINAL
56a
TERMINAL
58
59
54
QUERY CALL DISTRIBUTOR
DIRECTORY SERVICE SYSTEM
PSTN
40
44
LOCAL SWITCH
42
IGS
30
SMSS
24n
MSC
22
CGS
28
SMSC
24a
MSC
26
10
WIRELESS COMM. NETWORK
20

FIG. 1

FIG. 2

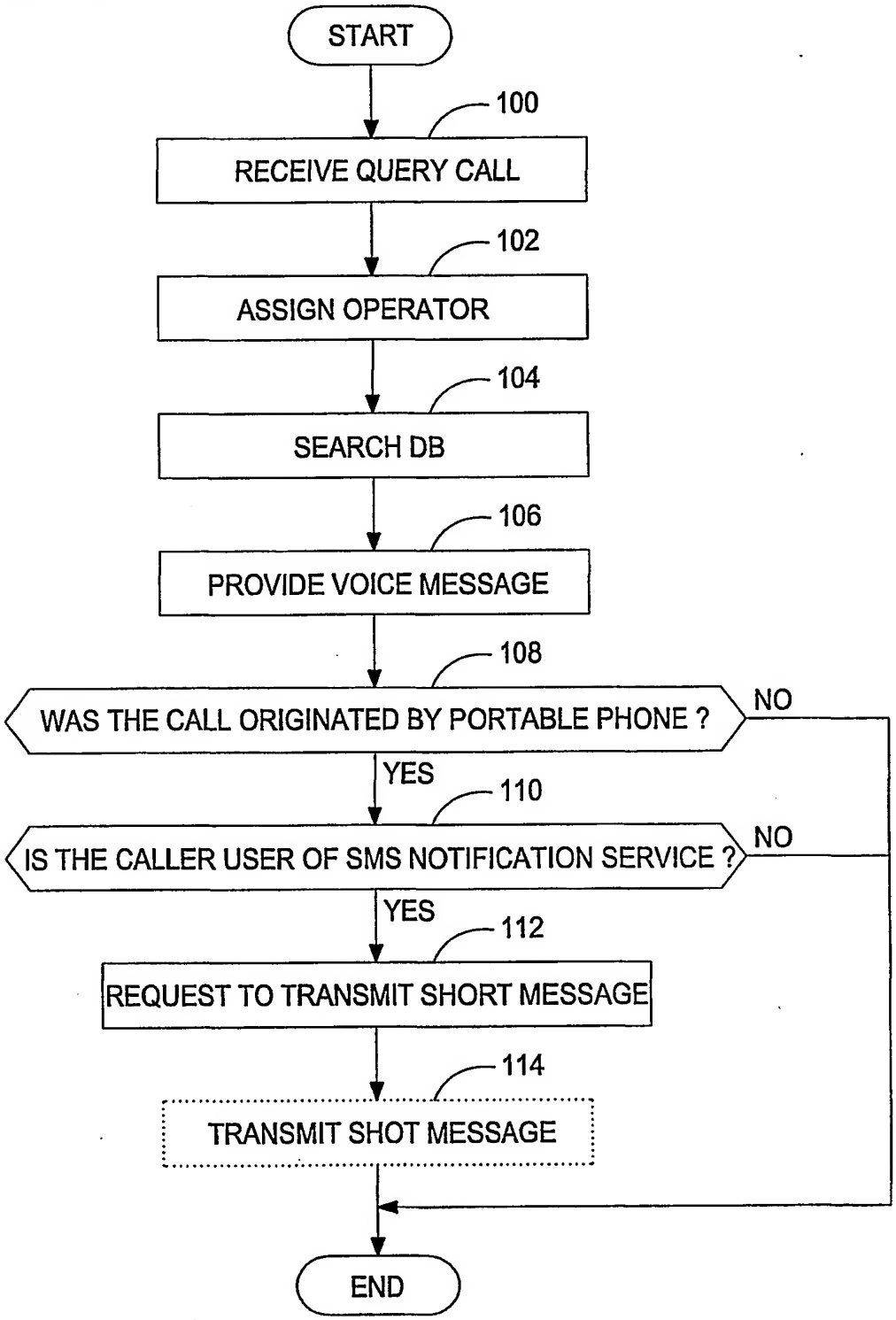

START
100
RECEIVE QUERY CALL
102
ASSIGN OPERATOR
104
SEARCH DB
106
PROVIDE VOICE MESSAGE
108
WAS THE CALL ORIGINATED BY PORTABLE PHONE ?
NO
YES
110
IS THE CALLER USER OF SMS NOTIFICATION SERVICE ?
NO
YES
112
REQUEST TO TRANSMIT SHORT MESSAGE
114
TRANSMIT SHOT MESSAGE
END

FIG. 3

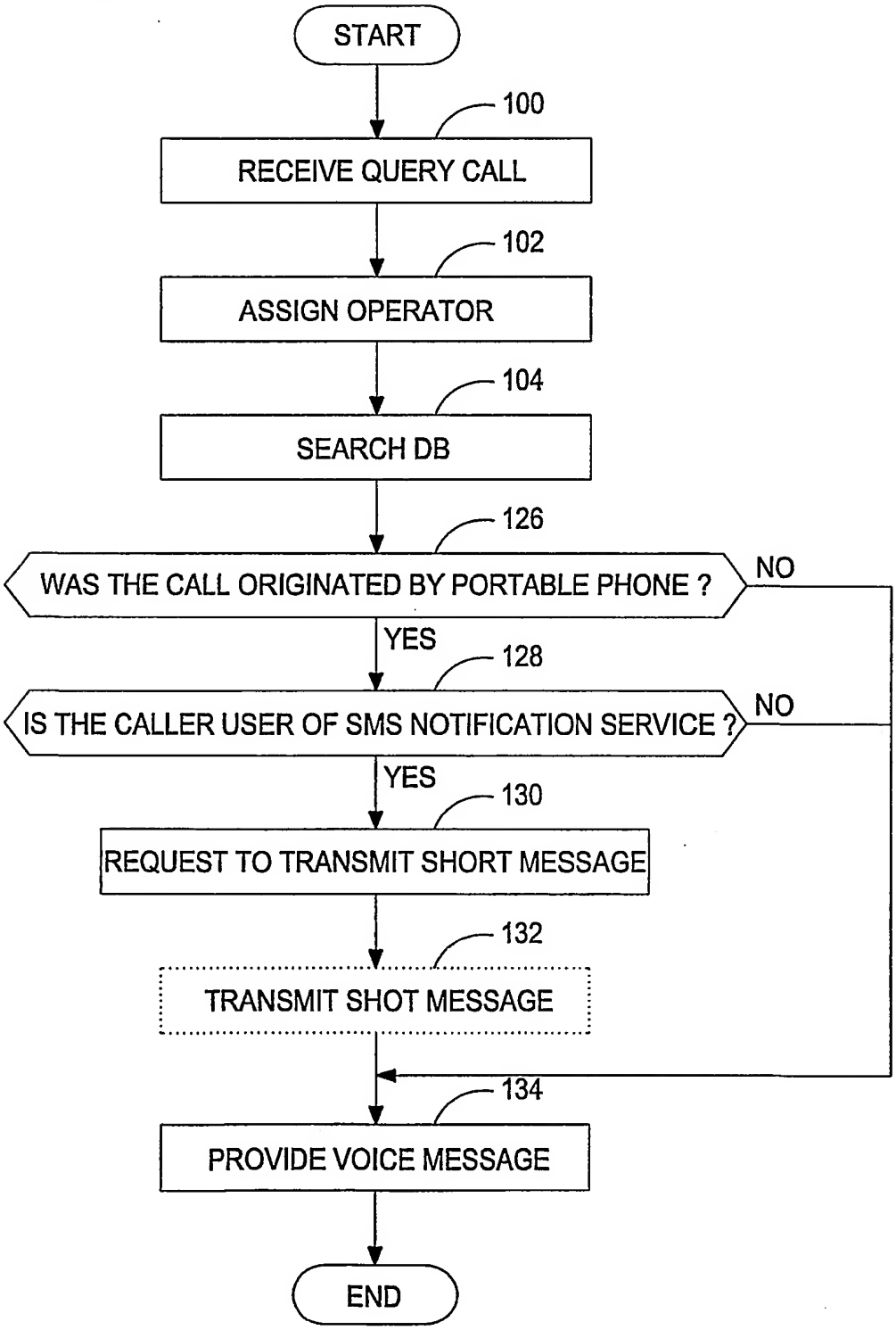
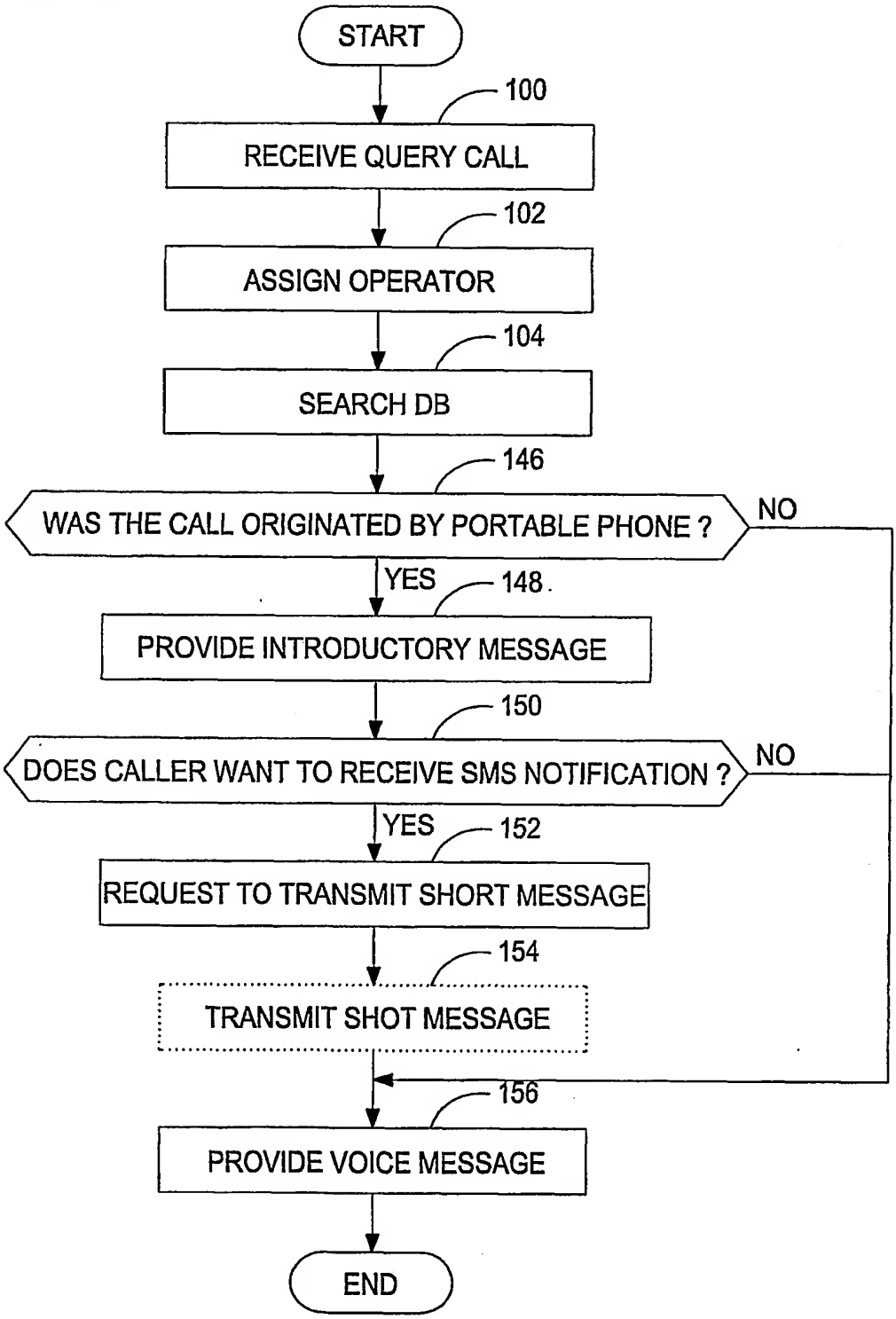

START
100
RECEIVE QUERY CALL
102
ASSIGN OPERATOR
104
SEARCH DB
126
WAS THE CALL ORIGINATED BY PORTABLE PHONE ?
NO
YES
128
IS THE CALLER USER OF SMS NOTIFICATION SERVICE ?
NO
YES
130
REQUEST TO TRANSMIT SHORT MESSAGE
132
TRANSMIT SHOT MESSAGE
134
PROVIDE VOICE MESSAGE
END

FIG. 4


START
100
RECEIVE QUERY CALL
102
ASSIGN OPERATOR
104
SEARCH DB
146
WAS THE CALL ORIGINATED BY PORTABLE PHONE ?
NO
YES
148
PROVIDE INTRODUCTORY MESSAGE
150
DOES CALLER WANT TO RECEIVE SMS NOTIFICATION ?
NO
YES
152
REQUEST TO TRANSMIT SHORT MESSAGE
154
TRANSMIT SHOT MESSAGE
156
PROVIDE VOICE MESSAGE
END

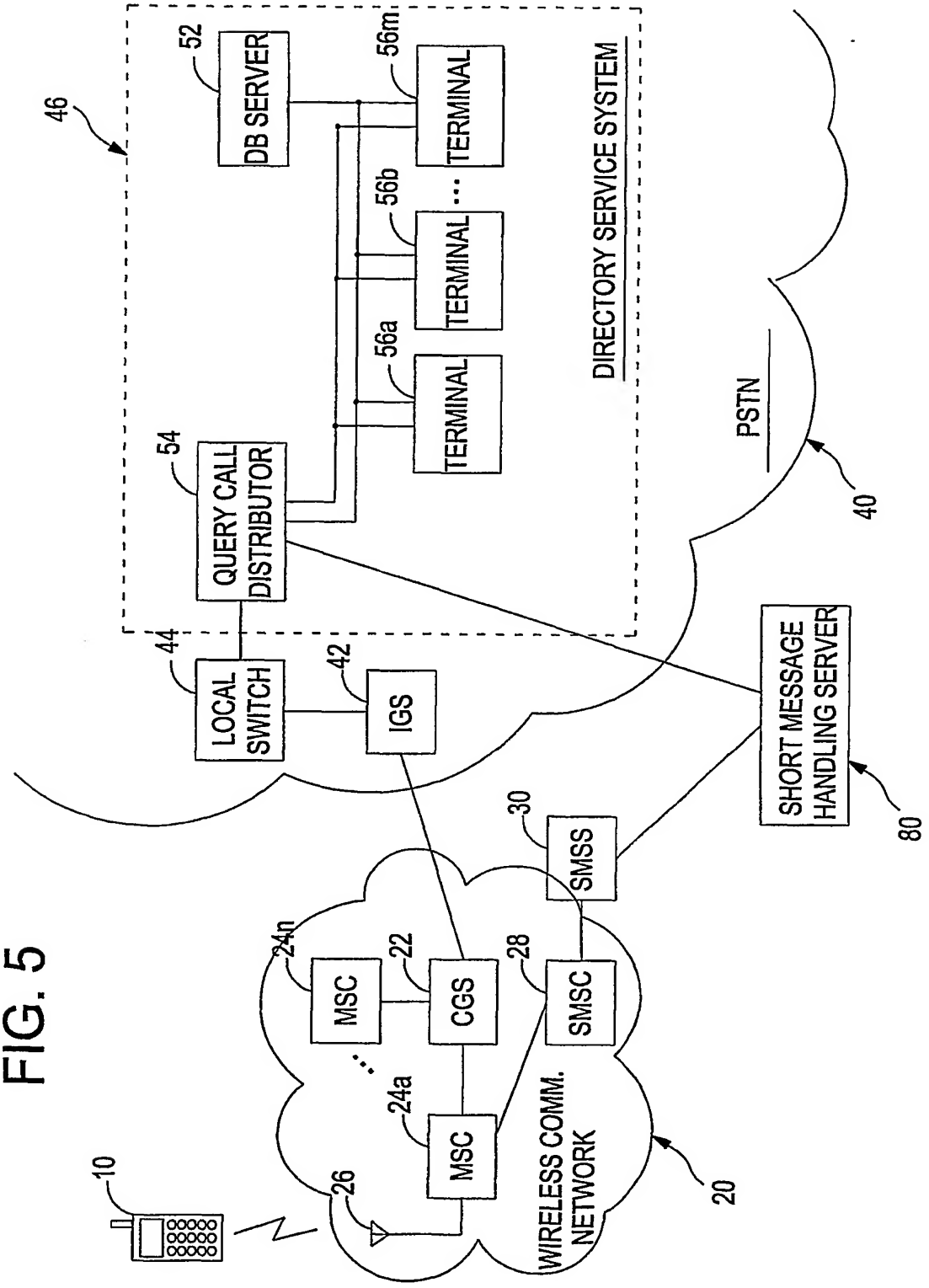

46
52
DB SERVER
56m
TERMINAL
56b
TERMINAL
56a
TERMINAL
DIRECTORY SERVICE SYSTEM
54
QUERY CALL DISTRIBUTOR
PSTN
40
44
LOCAL SWITCH
42
IGS
SHORT MESSAGE HANDLING SERVER
80
30
SMSS
24n
MSC
22
CGS
28
SMSC
24a
MSC
WIRELESS COMM. NETWORK
20
10
26

FIG. 5

FIG. 6

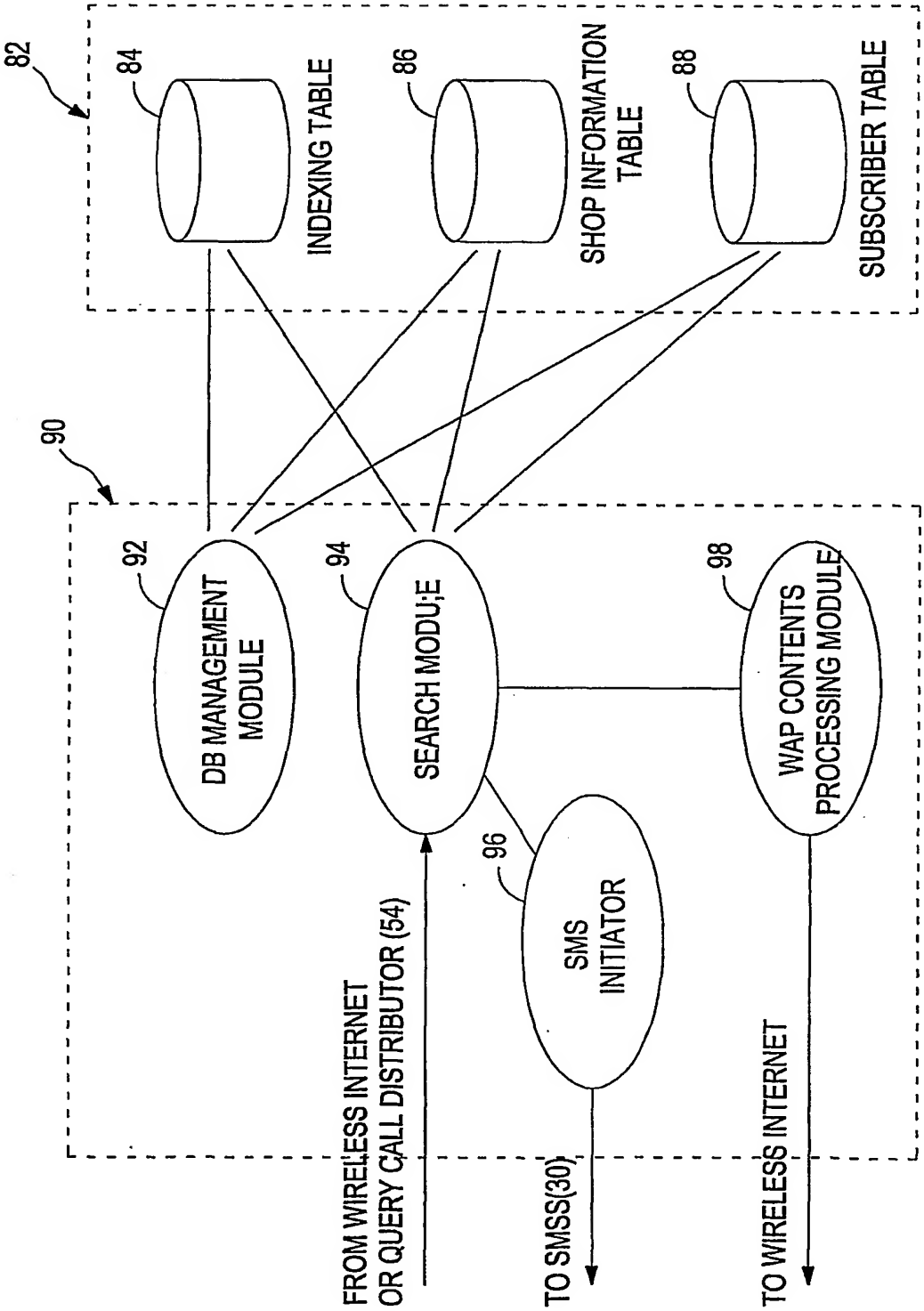

82
84
INDEXING TABLE
86
SHOP INFORMATION TABLE
88
SUBSCRIBER TABLE
90
92
DB MANAGEMENT MODULE
94
SEARCH MODULE
98
WAP CONTENTS PROCESSING MODULE
96
SMS INITIATOR
FROM WIRELESS INTERNET OR QUERY CALL DISTRIBUTOR (54)
TO SMSS(30)
TO WIRELESS INTERNET

FIG. 7

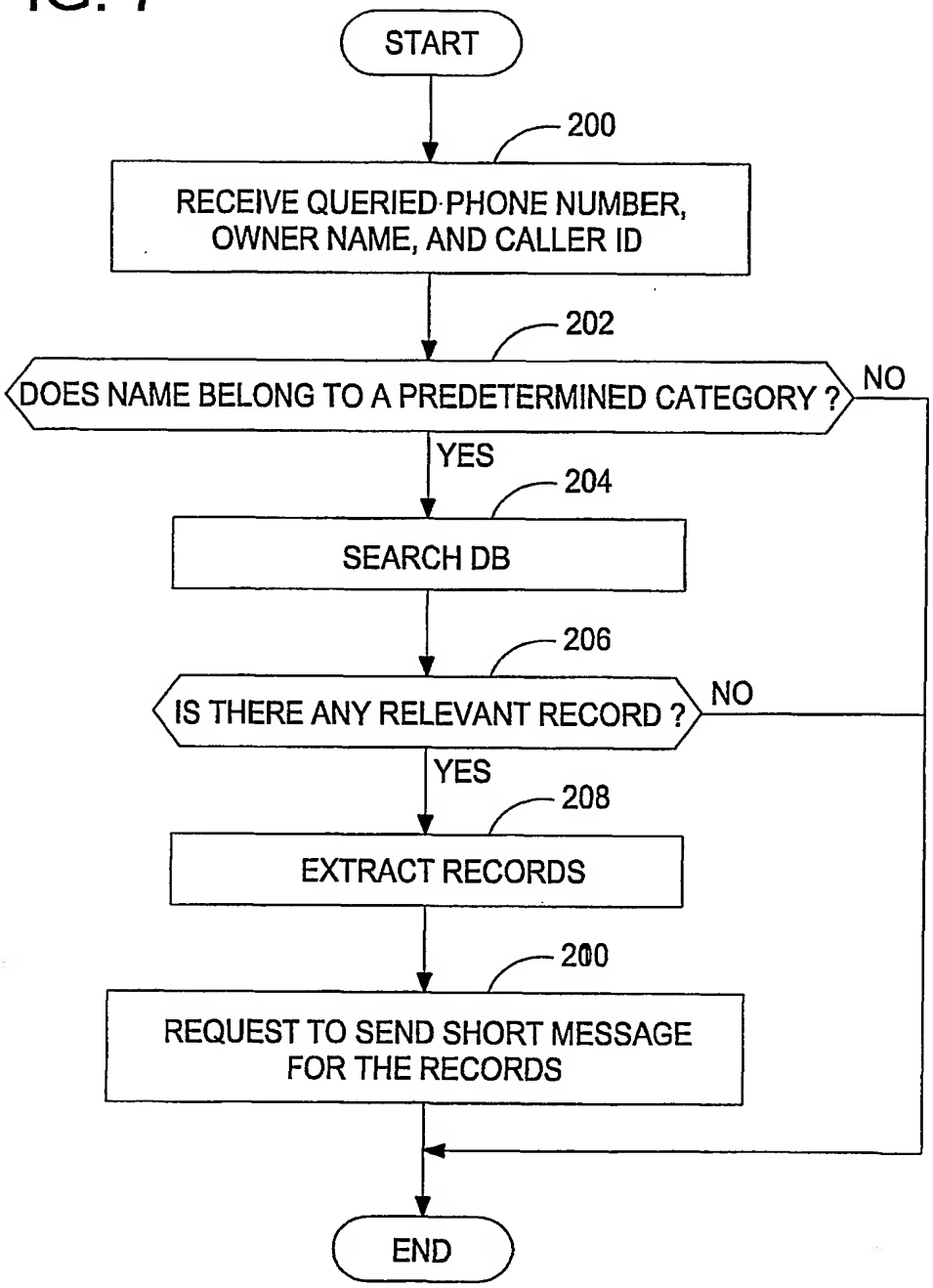
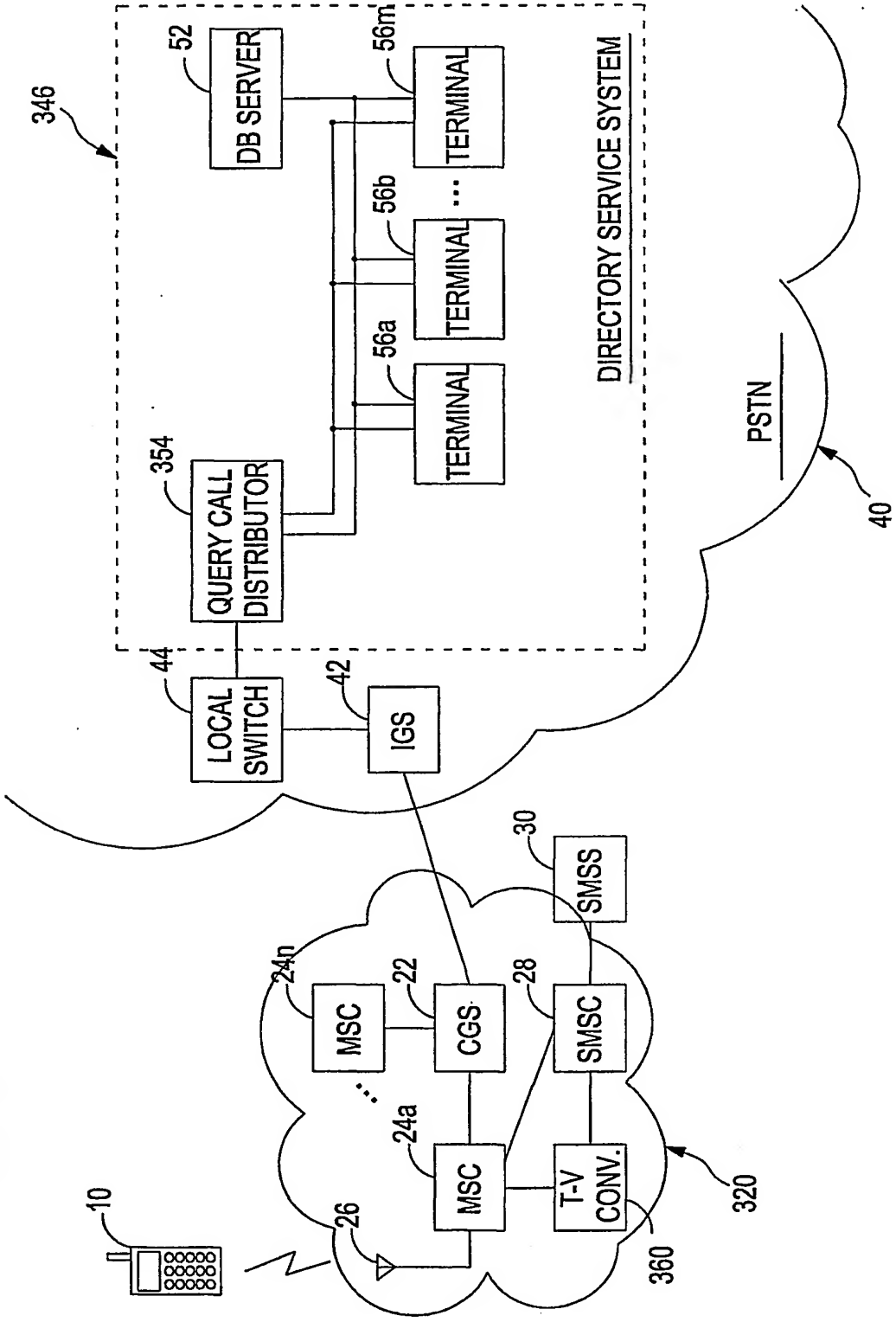

START
200
RECEIVE QUERIED PHONE NUMBER, OWNER NAME, AND CALLER ID
202
DOES NAME BELONG TO A PREDETERMINED CATEGORY ?
NO
YES
204
SEARCH DB
206
IS THERE ANY RELEVANT RECORD ?
NO
YES
208
EXTRACT RECORDS
200
REQUEST TO SEND SHORT MESSAGE FOR THE RECORDS
END

FIG. 8


346
52
DB SERVER
56m
TERMINAL
56b
TERMINAL
56a
TERMINAL
354
QUERY CALL DISTRIBUTOR
DIRECTORY SERVICE SYSTEM
PSTN
40
44
LOCAL SWITCH
42
IGS
30
SMSS
24n
MSC
22
CGS
28
SMSC
24a
MSC
T-V CONV.
320
360
26
10

# INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR02/00082

**A. CLASSIFICATION OF SUBJECT MATTER**

**IPC7 H04Q 7/24**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

H04Q 7/22, H4M 1/57, H04M 3/50

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

KR, JP : IPC as above

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | WO 97/16935 A (ERICSSON INC.) 9 MAY 1997, see abstract, Claims. | 1-14 |
| X | KR 98-37113 A (ELECTRONICS AND TELECOMMUNICATION RESEARCH INSTITUTE) 5 AUGUST 1998, see Claims, Fig.2 | 1-14 |
| Y | US 5613006 A (MORRIS REESE) 18 MAY 1997, see abstract, Fig.1a | 1-14 |

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevence

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevence; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevence; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art

"&" document member of the same patent family

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 11 JUNE 2002 (11.06.2002) | 11 JUNE 2002 (11.06.2002) |

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